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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BAYARD, EMMANUEL

ART UNIT	PAPER NUMBER
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2631

DATE MAILED: 12/30/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/585,202

Applicant(s)

TERRY, JOHN

Examiner

Emmanuel Bayard

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21 is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-14 and 16-20 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

1. This is in response to amendment filed 10/16/03 in which claims 1-10 and 12-21 are pending and claim 11 is canceled. The applicant's amendments have been fully considered but they are moot based on the new ground of rejection. Therefore this case is made final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Zimmermann et al U.S. Patent No 6,522,700 B1 in view of Kumar U.S. Patent No 6,246,698 B1 .

As per claims 1 and 17, Zimmermann et al discloses in a communication system having a first communication station and at least a second communication station, the first communication station at least operable to transmit data to the second communication station, an improvement of apparatus for the first communication for coding the data prior to transmission thereof at the first communication station, said apparatus comprising: a first modulator coupled to receive indications of the data to be communicated by the first communication station, said first modulator for modulating the indications of the data to form a first modulated signal representative thereof (see fig.1 element 20 and col.4, lines 6-7, 35, 55-58); a mapper (see fig.1

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element 40 and col.4, lines 34, 52-58 and col.5, lines 1-2) coupled to the first modulator, said mapper for mapping at least a portion of the first modulated signal formed by said first modulator to a selected dimension value selected from amongst a plurality of available dimension values.

However, Zimmermann et al does not teach a second modulator coupled to said mapper, said second modulator containing a set of substantially orthogonal bases, the substantially orthogonal bases of the set corresponding in dimension to the selected dimension values into which said mapper maps the at least the portion of the first modulated signal, said second modulator for forming a second modulated signal, the second modulated signal of a dimension responsive to the selected dimension value into which said mapper maps the portion of the first modulated signal and the second modulated signal forming biorthogonal codes defined by the substantially orthogonal bases that define multiple dimensional modulation data for transmission to the second communication station.

Kumar teaches a second modulator coupled to said mapper, said second modulator containing a set of substantially orthogonal bases, the substantially orthogonal bases of the set corresponding in dimension to the selected dimension values into which said mapper maps the at least the portion of the first modulated signal, said second modulator for forming a second modulated signal, the second modulated signal of a dimension responsive to the selected dimension value into which said mapper maps the portion of the first modulated signal and the second modulated signal forming biorthogonal codes defined by the substantially orthogonal bases that define multiple dimensional modulation data for

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transmission to the second communication station. (See fig.5 element 83 and col.42, lines 19-67 and col.48, lines 50-67 and col.51, lines 24-67).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Kumar into Zimmermann as to determine whether the transmitted signal corresponds to one of the points defined as 4-Ary PSK constellation #1 or one of the points defined as 4-Ary constellation #2 as taught by Kumar (see col.51, lines 45-67).

As per claim 2, the system of Kumar teaches a summer (see fig.5 element 93) coupled to the second modulation. Furthermore implementing such teaching into Zimmermann would have been obvious to one skilled in the art as to form combined modulated signals as would be known in the art for transmission over communication channels.

As per claim 3, Zimmermann teaches modulated signal values selected from real and imaginary value set (see figs. 5, 6) corresponds to the claimed (antipodal value set).

As per claims 4 and 5, Zimmermann teaches first modulator comprising BPSK (see col.2, lines 7, 40).

As per claims 6 and 7, Zimmermann teaches modulated signal formed of successive groups each group having a most significant value and a least significant value (see col.4, lines 50-58).

As per claim 8, Zimmermann et al would include a most significant bit for determining of whether the portion of the first-modulated signal is to be of a positive value and wherein the at least one least significant bit for determining to which dimension value the portion of the first

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modulated signal is mapped as to supplied each portion to a separate channel encoder having a predetermined code rate.

As per claim 16, Zimmermann et al teaches $2n$ PSK and 8-PSK (see col.2, line 8 and col.4, lines 5, 54-56). Furthermore implementing a Q2PSk and 8-ary biorthogonal code into Zimmermann would have been obvious to one skilled in the art as to supplied each portion to a separate channel encoder having a predetermined code rate.

As per claim 18, the method of Kumar teaches the additional operation of combining together successive portions of the modulated signal (see fig.5 element 93). Furthermore implementing such teaching into Zimmerman would have been obvious to one skilled in the art as to facilitate equalization and synchronization in the receiver.

As per claim 19, the method of Kumar does include orthogonal base of a set of substantially orthogonal bases (see col.42, lines 34-67). Furthermore implementing such teaching into Zimmerman would have been obvious to one skilled in the art as to facilitate equalization and synchronization in the receiver.

As per claim 20, the method of Zimmerman does include mapping of indication data (see fig.6 element 56).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann

U.S. Patent No 6,522,700 B1 as applied to claims 1-8 above in view of Kumar U.S. Patent No 6,246,698 B1 and further in view of Heath, Jr et al U.S. Patent No 6,298,092 B1.

Zimmermann et al and Kumar teach in combination all the features of the claimed invention except a mapper comprises a single throw , multi hole switch element, a one-to-2N-1 switch.

Heath, Jr teaches a mapper comprises a switch unit considered as the claimed (single throw , multi hole switch element, a one-to-2N-1 switch) (see figs.3, 6 elements 60, 202 and col.7, lines 41-55 and col.8, lines 4-25 and col.12, lines 27-45).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Heath into Zimmermann and Kumar as for the criteria for selecting the applied mapping scheme will dictate the setting of switch 202 and operation of blocks 206, 208, 68 as taught by Heath (see col.12, lines 47-51).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann U.S. Patent No 6,522,700 B1 as applied to claims 1-8 above in view of Kumar U.S. Patent No 6,246,698 B1, and further in view of Chapman U.S. Patent No 6,272,108 B1.

Zimmermann et al and Kumar teach in combination all the features of the claimed invention except a rotator coupled between the mapper and the second modulator.

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Chapman teaches rotator (fig.3 element 57) coupled between the mapper (see fig.3 element 54 and the second modulator (see fig.3 element 78).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Chapmann into Zimmermann and Kumar as to perform vector multiplication on the rotation vector and the mapped N-2s msb to cause a phase rotation, thus producing the final quadrant symmetric circular signal space constellation as taught by Chapman (see col.7, lines 43-46).

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann U.S. Patent No 6,522,700 B1 as applied to claims 1-8 above in view of Kumar U.S. Patent No 6,246,698 B1, and further in view of Ling et al U.S. Patent No 6,377,607 B1.

Zimmermann et al and Kumar teach in combination all the features of the claimed invention except an energy detector coupled to receive indications of the data transmitted by the first communication station and received at the second communication station, said energy detector for detecting energy levels of the indications, thereby to determine values representative of the data.

Ling et al teaches a C/I estimation circuit (see figs.5, 6, 9 elements 92, 120, 210 and col.10, lines 40-65 and col.11, lines 34-55 and col.16, lines 34-67) corresponds to the claimed (energy detector) coupled to receive indications of the data transmitted by the first communication station and received at the second communication station, said estimation circuit (energy detector) for detecting power corresponds to the claimed (energy levels) of the indications, thereby to determine values representative of the data.

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It would have been obvious to one of ordinary skill in the art to implement the teaching of Ling et al into Zimmermann and Kumar as to compute the total received energy per chip which includes both a desired signal and an interference signal component as taught by Ling et al (see col.12, lines 38-40).

As per claim 14, Ling et al teaches a normalizer (see fig.9 element 212 and col.16, lines 42-67 and col.17, lines 1-30) coupled to receive the indications of the data receive at the second communication, said normalizer for normalizing the indications of the data and for generating a normalized representation thereof; a square-law device (see fig.9 element 214, 215 and col.16, lines 43-67) coupled to the receive the normalized representations by said normalizer, said square-law device for forming a squared representation of the normalized representation of the indications of the data.

It would have been obvious to one of ordinary skill in the art to implement the teaching of Ling et al into Zimmermann and Kumar as compute the average of the square of the complex normalized data samples representing an estimate of the energy of the data samples as taught by Ling (see col.16, lines 58-65).

Allowable Subject Matter

6. Claims 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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7. Claim 21 is allowed over the prior art of record.
8. The following is a statement of reasons for the indication of allowable subject matter: a derotator for derotating the indications of the data received at the second communication station as recited in claims 15 and 21.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Sharma et al U.S. Patent No 6,259,728 B1 teaches a data communication method and system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is (703) 308-9573. The examiner can normally be reached on Monday-Thursday from 8:00 AM - 5:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour, can be reached on (703) 306-3034. The fax phone number for this Group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-3800.



Emmanuel Bayard

Primary Examiner

December 23, 2003